

Solubility of  $\beta$ -HMX and control of crystal size by supersaturation at cooling crystallization차상우, 김광주<sup>†</sup>

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HMX is a crystalline high explosive material that has been widely used in military applications. HMX has  $\alpha$ ,  $\beta$ ,  $\gamma$  and  $\delta$ -forms with four different crystal structures. Among them,  $\beta$ -HMX is used, and a recrystallization experiment is performed. The solubility of  $\beta$ -HMX is measured in a binary solvent of propylene carbonate and water. In cooling crystallization, the temperature process is carried out at 353.15~273.15K and 363.15~273.15K. In the binary solvent of PC and water, it is confirmed that the solubility of HMX increased as the amount of PC increased. In addition, real-time concentration measurements are made by using Raman at different cooling rates. Cooling crystallization can control the degree of supersaturation by controlling the cooling rate. The degree of supersaturation affects the rate of nucleation and crystal growth. Therefore, degree of supersaturation must be controlled to obtain the desired crystal size. The degree of supersaturation and crystal size are inversely proportional. It is confirmed that the faster the cooling rate, the smaller the crystal size and the lower the density.